

IMPROVEMENTS IN OR RELATING TO  
MOULDED PLASTICS TUBULAR COUPLINGS

**BACKGROUND TO THE INVENTION**

**1. Field of the Invention**

This invention relates to moulded plastics tubular couplings and is particularly although not exclusively applicable to tube end supports for locating a tube end in a tube coupling.

**2. Background Prior Art**

My European Patent Publication No. 0756126 discloses a tube coupling comprising a coupling body having a throughway open at one end to receive a tube, the diameter of the throughway increasing towards said open end at a first step to form a first enlarged diameter portion to receive a tube and a second step to form a second enlarged diameter portion to receive a tube locking device to hold a tube in the coupling body. A thin wall sleeve has one end engageable in the throughway and the other engageable in the tube to be located in the coupling body so that, in use, the sleeve extends from the tube past the first step into the throughway. The sleeve has a sealing engagement with the internal diameter of the tube to prevent leakage between the sleeve and tube and the end of the sleeve projecting from the tube has an annular seal with seals with the throughway in the coupling body to prevent leakage between the sleeve and coupling body.

My European Patent Application No. 99308504.2 discloses a tube end support for locating a tube end in a tube coupling, comprising a sleeve to be received in a tube, an encircling end stop adjacent one end of the sleeve to limit entry of the sleeve into the tube, encircling gripper means on the sleeve to grip on the

internal diameter of a tube to hold the tube on the sleeve and a separate annular seal supported by the end and projecting radially outwardly thereof to seal with the internal diameter of a tube coupling in which the assembly of the end support and tube are located.

#### SUMMARY OF THE INVENTION

This invention provides a moulded plastics tubular coupling having a cylindrical surface to engage with a corresponding surface of another component, the surface having an annular recess therein and a flexible annular diaphragm formed in the recess integrally with the coupling and having an outer periphery extending proud of the cylindrical surface to engage and grip the corresponding surface of another component.

In one construction according to the invention the annular recess in the cylindrical surface of the coupling is V-shaped and the flexible diaphragm is formed at the apex of the V to be able to flex towards either side of the V when the coupling is engaged with another component.

In a preferred form of the invention the recess and diaphragm are formed on the outer cylindrical surface of the coupling to engage an inner surface of a component to encircle the coupling.

More specifically, in the case where the coupling is intended to receive an end of a length of tubing, the coupling may have a sleeve portion having said recess and diaphragm formed around the outer surface of the sleeve portion partway along the sleeve; a tapered portion at one end of the sleeve to facilitate insertion of the sleeve into an end of a length of tubing and an end stop at the other end of the sleeve

to limit the insertion of the sleeve into the tube.

By way of example the end stop may comprise an annular head formed at said other end of the sleeve projecting outwardly of the sleeve.

In one specific arrangement the head may be formed with means to grip/seal with an encircling component in which the sleeve is engaged.

For example the head may have an encircling groove in which an O-ring or similar seal is mounted.

In a further arrangement the outer surface of the head may have an annular recess in which a further flexible diaphragm is formed integral with the head and projecting proud of the outer surface of the head to engage and lock the head in the bore of a component in which the coupling is located.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

The following is a description of some specific embodiments of the invention, reference being made to the accompanying drawings in which :

Figure 1 is an elevation view of a tube end support for locating a tube end in a tube coupling;

Figure 2 is a sectional view through the support of Figure 1;

Figures 3 to 5 are similar views of further constructions.

#### **DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring firstly to Figure 1 of the drawings, there is shown a tube end support indicated generally at 10 for locating in an end part of a tube to be inserted in the throughway of a coupling body of a tube coupling, having a locking device such as a

collet to engage the tube end and a seal to seal with the tube end. The tube end support comprises a hard moulded plastics sleeve 11 having an annular head 12 at one end thereof. The sleeve has an internal bore 13 having a flared entry 14 at the head end of the sleeve.

The head 12 of the sleeve provides a radially annular face 15 directed along the sleeve which forms an end stop to limit insertion of the sleeve 16 into a tube end by engagement with the end of the tube as shown in Figure 2.

Midway along the sleeve 10 there is an annular V-section groove 19 in the outer surface of the sleeve in which an annular flexible diaphragm 20 is formed integral with the apex of the groove in the sleeve. The outer periphery of the diaphragm projects slightly beyond the outer periphery of the sleeve to engage the inner surface of the tube as the tube is forced over the sleeve to grip and seal with the inner diameter of the tube. The tube is thereby retained on the sleeve with a sealing engagement.

The end of the sleeve 10 remote from the head 15 has a shallow taper as indicated at 23 around its outer periphery to facilitate insertion of the end of the sleeve in the tube. The head 12 has an encircling annular square section groove 25 in which an O-ring or similar form of seal 26 is mounted to seal with the internal bore or throughway in the coupling body in which the tube end is located.

Figures 3 and 4 show a modified form of the tube support in which the O-ring seal and groove 25, 26 are omitted and in their place the head has an encircling V-section groove 27 in which a further annular flexible diaphragm 28 formed integrally with the head is formed. Again, the outer periphery of the diaphragm projects slightly proud of the outer surface of the head to engage, grip and seal with an internal bore 29 in a component of the tube coupling body 30 in which the tube end support is located.

Figure 5 of the drawings shows a further arrangement in which a second annular V-section groove 30 is formed in the outer surface of the sleeve between groove 19 and head 15. The second groove also has an annular flexible diaphragm 31 formed integrally at the apex of the groove and projecting radially from the groove marginally higher than diaphragm 20. Diaphragm 31 serves to grip and retain the sleeve 16 in a bore or hole whereas diaphragm 20 provides a seating function for the sleeve in the bore.